

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

MAILED

Ex parte YOSHIKAZU KANAISHI

MAY 29 1996

Appeal No. 95-0416
Application 07/678,146¹

PAT.&T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

HEARD: May 8, 1996

Before KRASS, BARRETT, and FLEMING, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's refusal to allow claims 1-8 and 10. Claim 9 has been cancelled.

The invention is directed to a semiconductor device with voltage supply converting circuits. The disclosed invention

¹ Application for patent filed April 1, 1991, entitled "Semiconductor Device Having Supply Voltage Converting Circuits."

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provides one of two voltages to an internal circuit in response to sensing the voltage at an external power supply terminal.

Claim 1, the sole independent claim, is reproduced below.

1. A semiconductor device comprising:

an internal circuit which is activated on being supplied with a voltage,

an external power supply terminal supplied with a power source voltage from outside,

a first supply voltage converting circuit which, when the power source voltage supplied to said external power supply terminal is an ordinary voltage, causes said power source voltage to be modified to supply the thus modified voltage to said internal circuit,

a control circuit for sensing the voltage at said external power source terminal and generating an output signal at an output terminal when a voltage higher than said ordinary voltage is supplied at said external power supply terminal, and

a second supply power converting circuit activated responsive to said output signal from said control circuit to supply a voltage pulled down from the voltage at said external power supply terminal to said internal circuit.

The examiner relies upon admitted prior art of appellant's figures 1 and 2 and the following references:

Sato	5,021,728	June 4, 1991 ²
Watanabe et al. (Watanabe)	5,023,476	June 11, 1991 ³

Claims 1-8 and 10 stand rejected under 35 U.S.C. § 103 (1994) as being unpatentable over Sato, Watanabe, and the admitted prior art of appellant's figures 1 and 2.

² Effective filing date November 15, 1989.

³ Effective filing date March 30, 1987.

OPINION

We reverse the examiner's rejection and enter a new ground of rejection pursuant to 37 CFR § 1.196(b).

The claims are separately argued and thus do not stand or fall together.

Sato discloses a power source apparatus which uses batteries whose voltage cannot be kept constant to drive a load, such as stepping motor 9 in figure 1. The unstable battery voltage is boosted or dropped by voltage transformer 2 to a given constant voltage level 4, and the motor or the like is driven by the stabilized voltage (column 1, lines 13-16). Controller 18 outputs control signals 14 to 17 to control ON/OFF operations of the transistors 10 to 13, respectively (column 3, lines 11-13), and to control transistor 5 to supply voltage from the transformer 2 or current from the battery 1 via diode 7 and resistor 8 (column 3, lines 14-55). In the embodiment of figure 4, the voltage from the battery power source is used by a circuit to control the current through the alternative path to the motor when transistor 5 is OFF.

The examiner finds that figures 1, 4, and 5 of Sato disclose "a control circuit (18) for sensing the power source voltage" (Examiner's Answer, page 2), that switch 5 is "activated to supply a voltage from the power source voltage

when the source voltage exceeds a predetermined value"

(Examiner's Answer, page 3), and (Examiner's Answer, page 4):

Sato in figures 1, 4 and 5 and abstract lines 5 and 11-17 teaches that when the level of the power source voltage (1) exceeds a predetermined value (normal voltage) in an electronic equipment the controller (18) selects a voltage output from the voltage transformer different from the power source voltage (see claim 6).

It is true that the abstract of Sato states that there is a controller for switching a transistor to select between the voltage output from the voltage transformer and the voltage directly output from the power source based on a level of the power source voltage. This would seem to refer to voltage transformer 2, transistor 5 and the controller 18; however, we find no description of this operation in the rest of Sato. The controller in Sato has only outputs to transistor switch 5 and to transistors 10 to 13 and no inputs that sense the level of the power source voltage. The only sensing of the power source voltage to switch a transistor we find is with respect to the transistor 46 and transistors 62-64 (column 5, line 22, to column 6, line 15). The circuit on the lower left side of figures 4 and 5 senses the level of the battery source voltage, and is the "second control means for adjusting the voltage obtained directly from the power source voltage in response to the level of the power source voltage" as recited in claim 6, but it is not connected to controller 18 and is in no way used to control the switch 5. In any case, appellant is correct

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that "[i]n the Sato arrangement, there is no possibility for the external voltage to be raised above the normal voltage which is the battery output" (Brief, page 5), as claimed. Therefore, Sato does not meet the "control circuit" limitation as recited in claim 1.

The examiner finds that "Sato does not disclose the use of a first voltage converting circuit and details about the control means" (Examiner's Answer, page 3). However, Sato also does not have "a voltage higher than said ordinary voltage" and so does not have a "control circuit" for sensing this voltage. Further, Sato does not show the controller 18 switching transistor 5 in accordance with sensing the power supply voltage. Thus, there are other differences between the claimed subject matter and Sato which need to be addressed.

Watanabe is basically identical to Japanese Patent Kokai Publication No. 62-232155 (1987) discussed in the specification as prior art figure 2. Appellant provided a copy of this reference during prosecution (Request for Reconsideration filed February 4, 1994, Paper No. 11). Watanabe is thus more closely related to the subject matter of appellant's invention than Sato. The examiner relies on Watanabe for the constant voltage generator 14. The examiner also relies on Watanabe as showing the use of a voltage divider R1, R2 in figure 3, apparently to meet the voltage divider limitation of claim 10.

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The examiner relies on the admitted prior art as showing the "use of input and output (5,6) level converters and first supply voltage convertor [sic] (2)" (Examiner's Answer, page 3). For simplicity, we limit our reliance to the admitted prior art of appellant's figure 2, which discloses input level converting circuit 16 and output level converting circuit 17 coupled to the internal circuit 11, supply voltage converter 12, and a MOS transistor 15 to supply voltage to the internal circuit.

The examiner has applied Watanabe and the admitted prior art to modify Sato in such a manner that we cannot sustain the rejection. The only obviousness statement by the examiner is the following (Examiner's Answer, page 3):

[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to use a first voltage converter in the circuit of Sato for applying the external voltage when he [sic, the] power supply voltage is an ordinary voltage or to use input and output level converter or to use voltage divider in the controller circuit (18) of Sato as taught by Watanabe and by the admitted prior art for controlling the operation of the switch (5) of Sato.

The only modification relevant to claim 1 is to use a first voltage converter in Sato in view of constant voltage generator 14 is Watanabe. However, Sato already has a constant voltage source 2 and Sato already switches between two voltage source; thus, there is no apparent reason why one skilled in the art seek to modify Sato. In addition, Sato does not

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operate to supply a voltage pulled down from a "voltage higher than said ordinary voltage" because the circuit in Sato has nothing to do with the problem of applying higher voltages to an internal circuit during burn-in testing. Because the motivation for the proposed rejection is lacking, we reverse the rejection of claim 1 and dependent claims 2-8 and 10.

Although we have reversed the rejection of independent claims, and therefore reverse the rejection of the dependent claims, some further comments are appropriate regarding the examiner's rejection of the dependent claims. The input and output level converters of the admitted prior art are needed only for claim 2. We find no motivation to modify the motor/solenoid/printer circuits of Sato with level converters because these are not internal circuits requiring level conversions. The voltage divider of Watanabe mentioned in the examiner's rejection is needed only for claim 10. Despite the language in the abstract of Sato, there is no indication that the controller 18 senses the power supply voltage. The examiner has failed to explain where the limitations of the "level shifting circuit" of claims 3 and 5, the "capacitance between the external power supply terminal and the ground" of claim 6, the "SRAM memory cells" of claim 8, and the "inverter" of claim 10 are to be found in the combination of references or why the limitations would have been obvious. Since the claims

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have been separately argued, it is the examiner's duty to address all the limitations of the claims.

NEW GROUND OF REJECTION UNDER 37 CFR § 1.196(b)

Claims 1, 2, 7, and 8 are rejected under 35 U.S.C. § 103 as being unpatentable over admitted prior art of figure 2 and Watanabe. The content of Watanabe and the admitted prior art of figure 2 have been addressed supra. There are two arguable differences between claim 1 and Watanabe and the admitted prior art of figure 2. Because it is necessary to discuss these arguable differences, we make the rejection under § 103.

First, claim 1 recites "to supply a voltage pulled down from the voltage at said external power supply terminal to said internal circuit." Watanabe discloses that when the MOSFET Q is rendered conductive "power supply terminal 16 is directly connected to main circuit section 12" (column 5, lines 13-14); the same is true of the prior art of figure 2. However, it is clear that the voltage supplied by this "direct" connection is less by the amount of the threshold voltage of the MOSFET. While appellant's voltage is "pulled down" by three threshold voltages (specification, page 10), and Watanabe and prior art figure 2 are only "pulled down" by one threshold voltage, claim 1 does not recite by how much the voltage is "pulled down." Thus, the "pulled down" limitation is met by Watanabe

and prior art figure 2. Appellant's arguments do not account for this interpretation, which was not raised by the examiner.

Second, there is a question whether the "control circuit" precludes the external trigger signal of Watanabe and prior art figure 2. As we interpret the "control circuit" limitation, it is does not. The control circuits of Watanabe and the admitted prior art of figure 2 are both "for sensing the voltage at said external power source terminal." And, both control circuits are for "generating an output signal at an output terminal when a voltage higher than said ordinary voltage is supplied at said external power supply terminal," because MOSFET Q in Watanabe and MOS transistor 15 in prior art figure 2 meet the condition of being turned on by an output signal from the control circuit when a higher voltage is supplied. The "generating" function does not limit how the voltage applied at the external terminal is produced; in particular, it does not preclude an external trigger signal in which the external voltage is reduced before being increased to be higher than the ordinary voltage as in Watanabe or prior art figure 2. As long as the control circuit generates an output signal when the voltage is higher than the ordinary voltage, the control circuit limitation is satisfied. For these reasons, claim 1 would have been obvious over Watanabe or the admitted prior art of figure 2.

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In regard to claim 2, the admitted prior art of figure 2 shows level converting circuits. It would have been known to one of ordinary skill in the art that level converting circuits are inherent in Watanabe, but, in any case, it would have been obvious to provide level converting circuits in Watanabe in view of prior art figure 2.

In regard to claims 7 and 8, Watanabe discloses that the internal circuit can be a dynamic random access memory (DRAM) (column 1, lines 17-48) or just a memory circuit (column 3, line 57). It would have been obvious that the internal circuit in prior art figure 2 could be a memory in view of Watanabe. It would have been obvious to make the memory cells in Watanabe or prior art figure 2 SRAM memory cells as recited in claim 8 because these are one well-known type of memory cell.

CONCLUSION

The rejection of claims 1-8 and 10 is reversed.

A new ground of rejection is entered against claims 1, 2, 7, and 8 pursuant to 37 CFR § 1.196(b).

Any request for reconsideration or modification of this decision by the Board of Patent Appeals and Interferences based upon the same record must be filed within one month from the date of this decision. 37 CFR § 1.197. Should appellant elect to have further prosecution before the examiner in response to the new rejection under 37 CFR § 1.196(b) by way of

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amendment or showing of facts, or both, not previously of record, a shortened statutory period for making such response is hereby set to expire two months from the date of this decision.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED - 37 CFR § 1.196(b)

ERROL A. KRASS
Administrative Patent Judge

LEE E. BARRETT
Administrative Patent Judge

Michael R. Fleming
MICHAEL R. FLEMING
Administrative Patent Judge

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